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ABSTRACT

Twenty four educable retarded males (eight gainers, eight non-gainers, and eight high scorers) were given an 18-item picture paired-associates task. Results showed that gainers learned more slowly than high scorers but the two groups together did not differ from nongainers. The following two interpretations were offered. With a minimal memory load, groups do not differ in ability to learn the paired-associates task, but when the load is increased to 10 items there may be a point at which nongainers are outperformed by gainers. When the load increases to 18 the performance of the gainers breaks down and both groups learn more slowly than high scorers. Secondly, there may be no memory load curve that differentiates gainers from nongainers, although increasing the load further differentiates the two groups from the high scorers. (Author/RJ)

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STUDIES IN LEARNING POTENTIAL

PERFORMANCE ON AN 18-ITEM PICTURE PAIRED-ASSOCIATE TASK AS A FUNCTION OF LEARNING POTENTIAL STATUS

By

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PERFORMANCE ON AN 18-ITEM PICTURE PAIRED-ASSOCIATE TASK AS A FUNCTION OF LEARNING POTENTIAL STATUS

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A number of studies within the Institute have compared the performance of LP groups on picture paired-associates learning. A number of variants of the PA paradigm have been used including forwards PA learning, i.e., the usual method of presentation, and backwards PA learning, i.e., a relearning task in which S must respond with the stimulus member of a previously learned PA pair when he is given the original response member as the new stimulus. Stimulus materials have included physical objects and photographic representations of objects. PA lists of varied length have been used as well as PA pairs whose members are of high and low conceptual similarity. This summary focuses on the issue of memory load requirement, i.e., list length, in studies using conceptually dissimilar PA members.

Six-item lists. With this relatively low memory load task no differences were found between gainers (including high scorers as gainers) and nongainers in two samples of comparable CA ranges: a community special class sample (CA 9 to 17 years) and a young institutionalized sample (CA 10 to 15 years) (Budoff, 1965). In the same study, however, gainers were found to be superior to nongainers among an older institutionalized sample (CA 17 to 23), a difference which was maintained in a subsequently reported re-analysis when high scorers were eliminated by matching on K_1 (Budoff, 1967). Whether this reflects a greater differentiation of LP groups in terms of learning ability as a function of age or a differential reaction to institutionalization which is reflected in PA learning (as well as, perhaps, in LP assessment) is unknown. Baumeister (1968) found a positive correlation between months of institutionalization and trials to criterion on an 8-item picture PA task, a finding suggesting length of institutionalization might have been an important factor in the Institute studies. Age must nevertheless have been a factor confounded with length of institutionalization. Ignoring the older institutionalized sample, then, it appears that LP groups are not differentiated on forwards PA learning involving a relatively low memory load.

When the memory load was extended to ten items and LP comparisons made among children ranging in age roughly from 7 to 15 years, the findings have been more variable. Gainers learned faster than nongainers with whom they were matched on CA, IQ, and K_1 (Budoff, 1965).

Similarly, White (1968) found gainers to learn faster than nongainers with gainers performing comparably to high scorers when defined by the Ravens LP assessment. No differences were found between gainers and nongainers by Glaser (1966) or Frank and Riley (1969) although the latter study (using Ravens LP and some of Glaser's Ss as well) did find high scorers to be superior to the other groups.

In summary, with a six-item low memory load there appear to be no differences between LP groups, i.e., gainer versus nongainer, on the acquisition of a picture paired-associate task. When the memory load is increased to ten items, the results become more variable with gainers sometimes performing the same as, and sometimes better than, nongainers, while high scorers perform the same as or better than, gainers. The present study extended the memory load to 18 items with hand-drawn dissimilar pictures (representing an increased degree of abstraction from previous stimulus materials which were photographic representations) and compared the performance of LP groups.

Method

Subjects: The subjects were 26 males from the Robbins School, Waltham, Massachusetts. Two gainers were discarded randomly to obtain 8 Ss in each LP category: nongainers (CA = 159.0, SD = 16.74), gainers (CA = 155.13, SD = 13.44), high scorers (CA = 163.25, SD = 14.8).

Procedure: An 18-item picture paired-associates task was presented in the study-test paradigm without correction. Stimuli were pictures from the Peabody Picture Vocabulary Test, and the S and R members of the picture pairs had no obvious formal similarity. Four sequences of presentation were constructed so that no sequence contained items in the same position as any other sequence, and no items were contiguous in more than one sequence. The pictures were rear-projected onto an 18-inch by 18-inch screen, and the rate of presentation was under the control of the S. Ss were given a three-item pretraining task to insure that they understood the requirements of the task. On the first study trial, Ss were instructed to name each of the pictures out loud. Idiosyncratic responses were accepted, and thereafter during test trials the S's idiosyncratic responses or good synonyms were accepted as correct responses as well as the standard responses and their synonyms. Ss were run for five trials or until one completely correct test trial.

Results

A one-way analysis of variance was performed with errors as the dependent variable and learning potential status as the independent variable. The LP effect was significant, $F(2, 21) = 3.58$, $p < .05$ (see Table 1). The overall LP main effect was divided into two discrete hypotheses:

a) H_1: $G = NG$ $\qquad$ H_2: $HS = (NG + G)/2$

Gainers failed to differ from nongainers although the two groups together did not learn as rapidly as the high scorers. For didactic purposes only the LP effect was divided into two different hypotheses not independent from the above hypotheses but which are comparable to analyses performed in previous experiments.

b) H_3: G = HS $\qquad$ H_4: $NG = (G + HS)_{/2}$

The results showed that gainers learned more slowly than high scorers but the two groups taken together did not differ from nongainers.

Discussion

When the memory load was increased to 18 items there appeared to be clear differences among LP groups favoring the high scorers but not differentiating between gainers and nongainers. Although the mean differences are significant there was considerable overlap of performance among groups with one nongainer performing better than all other Ss. Two interpretations appear likely. (1) With minimal memory load, LP (Kohs) groups do not differ in ability to learn a forwards picture paired-associates task. When the load is increased to around 10 items, there may be a point at which non-gainers are outperformed by gainers who perform comparably to high scorers. But beyond this point when the load becomes excessive (18 items) the performance of the gainers breaks down such that they no longer differ from nongainers, and both groups learn more slowly than high scorers. (2) Or it may be that there is no memory load curve that differentiates gainers and nongainers (Kohs) from each other although increasing load continues to further differentiate these two groups from high scorers.

The earlier studies (Budoff, 1965, excluding older institutionalized Ss) found no difference between gainers and nongainers with the six item list. Hypothesis set (b) also shows no difference between nongainers and (gainers + high scorers). Thus, it is possible that even with a low memory load that high scorers would have done better than either of the other two groups if analyzed separately as we have done in hypothesis set (a). With the 10-item list, high scorers did learn faster (Frank & Riley, 1969) than gainers or non-gainers. The only two studies which counter this second interpretation are the 10-item study reported by Budoff (1965) showing gainers more efficient than nongainers and White's (1968) study showing gainers comparable to high scorers and both better than nongainers. (Both Frank & Riley and White used Ravens LP and found conflicting results on PA learning.) Although it is impossible to draw any conclusions about the ability of gainers relative to nongainers and high scorers from the variety of picture paired-associates tasks of different memory load requirements which have been carried out, it does appear clear that high scorers learn the task at the 10- and 18-item loads more efficiently than nongainers.

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Table 1. Analysis of Variance-Errors: Picture Paired-Associate Learning.

Source	df	MS	F	P
LEARNING POTENTIAL	(2)	1063.17	3.58	< .05
a. H_1: G = NG	1	72.25	0.24	--
H_2: HS = (NG + G)/2	1	2054.08	6.93	< .025
b. H_3: G = HS	1	1892.24	6.38	< .025
H_4: NG = (G + HS)/2	1	234.13	0.79	--
Within Ss Error	21	296.60		
Total	23			

Appendix A - Raw Data

Nongainers

I.D. No.	No. Errors	
40122	46	
40015	34	
40103	66	
40104	9	Mean Errors = 50.13
40106	72	
40111	57	
40118	49	
40140	68	

Gainers

I.D. No.	No. Errors	
40141	46	
40010	42	
40101	41	
40110	39	Mean Errors = 54.38
40117	55	
40114	69	
40115	67	
40139	76	
40123	14)	Randomly discarded to obtain
40121	70)	proportionality in groups.

High Scorers

I.D. No.	No. Errors	
40138	28	
40105	17	
40223	54	
40007	22	Mean Errors = 32.63
40011	25	
40108	47	
40102	51	
40120	17	